

A SURVEY OF THE COCCINELLIDAE (COLEOPTERA) ASSOCIATED WITH NURSERY STOCK IN MARYLAND

C. L. STAINES, JR., M. J. ROTHSCHILD, AND R. B. TRUMBULE

Maryland Department of Agriculture, Office of Plant Industries and Resource Conservation, Plant Protection Section, 50 Harry S Truman Parkway, Annapolis, Maryland 21401.

Abstract.—Twenty-eight species of adult Coccinellidae were collected in Maryland nurseries from 1986 to 1988. Host plants, presence of prey, and active predation (if any) were recorded for each species. The most commonly detected species were *Coccinella septempunctata* L., *Coleomegilla maculata lengi* Timberlake, and *Hippodamia convergens* Guérin. Coccinellidae populations were seldom high and the number of times beetles were collected was low compared to the number of nurseries visited.

Key Words: host plants, prey

Recently there has been a shift in the pest control practices of commercial nurseries away from cover sprays to spot spraying. Under this new regime, pest control by natural enemies is both desirable and feasible. The Coccinellidae have long been known as major predators of various Homoptera and Acari. Gordon's (1985) treatise on North American Coccinellidae has facilitated adult identification to species. A survey of the Coccinellidae found in Maryland nurseries was undertaken to determine the variety of species present, their frequency of occurrence, and abundances.

MATERIALS AND METHODS

Adult Coccinellidae were collected during routine nursery inspections. In addition to the typical collection data, host plants, presence and type of prey, and feeding activity by the coccinellids were also noted. Specimens were placed in 70% ethyl alcohol and taken to the laboratory for mounting. Adults were identified by the senior author using Gordon (1985). No efforts were made to identify larvae. Voucher specimens are de-

posited in the Maryland Department of Agriculture collection.

RESULTS AND DISCUSSION

Twenty-eight species representing eighteen genera were collected. Coccinellidae were found in 67 locations in 1986, 82 locations in 1987, and 37 locations in 1988. One reason for the low detection rate in 1988 is that several field personnel only reported unusual coccinellids. Possibly another reason was that the drought conditions and high temperatures during the summer made most adult coccinellids seek protected locations. Prey numbers were also low, possibly due to the same conditions.

Four species were found in high numbers, but most were observed as occasional adults scattered over large areas. The species found are listed below with the counties, host plants (names as listed in Hortus III, 1976), prey associations or feeding activities, and the months in which specimens were collected. The relative frequency of each species is indicated.

SCYMNINAE

Scymnini

Scymnus cervicalis Mulsant: Anne Arundel, Prince George's. *Catalpa* sp., *Quercus* sp. Associated with aphids (Homoptera: Aphididae). May. Two locations.

S. tenebrosus Mulsant: Anne Arundel, Montgomery. *Catalpa* sp., *Malus* sp. Associated with aphids. May. Two locations.

Stethorus punctum punctum (LeConte): Prince George's. *Gleditsia tricanthos* L., *Platanus* sp., *Quercus* sp. April, July. Two locations.

Hyperaspini

Brachicantha felina (Fab.): Montgomery, Prince George's. *Betula* sp., *Malus* sp. Associated with aphids. May, June, August. Four locations.

B. rotunda Gordon: Harford, Montgomery. *Betula* sp., *Malus* sp., *Robinia pseudoacacia* L. Associated with aphids. Four locations.

B. quadripunctata quadripunctata (Melsheimer): Prince George's. May. One specimen.

B. ursina (Fab.): Baltimore. June. One specimen.

Hyperaspis binotata (Say): Baltimore, Prince George's. *Prunus* sp., *Quercus* sp. April, May. Associated with *Melanaspis obscura* (Comstock) (Homoptera: Diaspididae). Two locations.

H. signata signata (Olivier): Anne Arundel, Carroll. May, June. *Juniperus scorulorum* Sarg. Feeding on *Carulaspis* sp. (Homoptera: Diaspididae). Three specimens.

H. proba (Say): Baltimore, Kent, Prince George's. *Quercus* sp. July, November. Associated with *M. obscura*. Three locations.

CHILOCORINAE

Chilocorini

Chilocorus kuwanae Silvestri: Specimens of this species were released against various Diaspididae. Recoveries were made in Prince George's and Worcester. *Ilex cor-*

nuta Lindl. & Paxt., *I. crenata* Thunb., *Quercus* spp. Feeding on *Hemiberlesia lantaniae* (Signoret), *Lopholeucaspis japonica* (Cockerell), *M. obscura*. Two locations.

C. stigma (Say): Baltimore, Carroll, Howard, Kent, Montgomery, Prince George's, St. Mary's, Somerset. *Acer* sp., *A. palmatum* Thunb., *Euonymus alata* (Thunb.) Sieb., *Fraxinus* sp., *Prunus* sp., *Quercus* sp., *Q. palustris* Muenchh., *Q. robur* L. Associated with *Lepidosaphes yangagicola* Kuwana, *M. obscura*, *Pseudaulacaspis* sp. (Diaspididae), *Eulecanium cerasorum* (Cockerell) (Coccidae). March, April, May, June, July, September, November. Nineteen locations. This species was common in only one location. All other collections represent only a few individuals.

Exochomus marginipennis (LeConte): Kent, St. Mary's. *Robinia pseudoacacia*. May, November. Two specimens.

COCCIDULINAE

Coccidulini

Rhyzobius lophanthae (Blasidell): Montgomery. *Pinus* sp. October. One specimen.

COCCINELLINAE

Coccinellini

Adalia bipunctata (L.): Anne Arundel, Baltimore, Caroline, Carroll, Harford, Kent, Montgomery, Prince George's, St. Mary's. *Acer rubrum* L., *Betula* sp., *Carpinus betulus* L., *Elageanus umbellata* Thunb., *Euonymus alata*, *Forsythia intermedia* Zab., *G. triacanthos*, *Lonicera sempervirens* L., *Malus* sp., *Picea abies* (L.) Karst., *Pinus mugo* Turra, *P. strobus* L., *Prunus* sp., *Pyracantha* sp., *Quercus bicolor* Willd., *Rosa rugosa* Thunb., *Salix* sp., *Sorbus acuparia* L., *Spiraea nipponica* Maxim., *Viburnum* sp., *V. rhytidophyllum* Hemsl. Feeding on aphids. April, May, June. *Adalia bipunctata* was the fourth most common species found in the survey (47 locations, five commonly).

Anatis labiculata (Say): Anne Arundel, Baltimore, Carroll, Howard, Montgomery,

Prince George's. *Acer rubrum*, *A. saccharum* Marsh., *Betula* sp., *Cornus florida* L., *Ligustrum* sp., *Pyracantha* sp., *Quercus* sp., *Q. acutissima* Carruth., *Tsuga canadensis* (L.) Carriere, *Ulmus* sp., *Viburnum* sp. April, May, June. Thirteen locations.

A. mali (Say): Harford, Prince George's. *Pinus sylvestris* L. May. Two specimens.

Axion tripustulatum (DeGeer): Prince George's. *Quercus* sp. Associated with *M. obscura*. April. One specimen.

Coccinella novemnotata Herbst: Allegany, Carroll. June, July. Two locations. This species used to be very common in Maryland, judging by the number of specimens in student collections at the University of Maryland and observations by the senior author. Since the introduction of *C. septempunctata* L., the species has only been collected twice in 1986. Whether this is due to a natural decline or competitive displacement is not known at present.

C. septempunctata L.: Allegany, Anne Arundel, Baltimore, Carroll, Charles, Frederick, Harford, Howard, Kent, Montgomery, Prince George's, Queen Anne's, Somerset, St. Mary's, Talbot, Wicomico, Worcester. *Acer saccharum*, *Betula* sp., *Crataegus* sp., *Elageanus umbellata*, *Euonymus* sp., *Fraxinus* sp., *Hemerocallis* sp., *Ilex cornuta* Lindl. & Paxt., *Juniperus* sp., *Malus* sp., *Pieris japonica* (Thunb.) D. Don, *Pinus* sp., *P. sylvestris* L., *P. thunbergiana* Franco, *Prunus* sp., *Pyracantha* sp., *Pyrus calleryana* Decne., *Rhododendron* sp., *Rosa* sp., *Quercus* sp., *Q. robur*, *Spiraea* sp., *Taxus* sp., *Tilia* sp., *Tsuga canadensis*, *Viburnum* sp., *Wisteria* sp., *Zelkova serrata* (Thunb.) Makino. March, April, May, June, July, August, September, October, November. This was the most commonly collected species in the survey (87 locations). Feeding on aphids. *Coccinella septempunctata* was taken in large numbers on several occasions. On three separate occasions adult *C. septempunctata* were collected on the bark of cut Christmas trees of *Picea abies*, *P. pungens* Engelm., and *Pinus sylvestris*. The or-

igin of these trees was eastern Pennsylvania. The movement of cut Christmas trees provides an interesting method of distribution for this species. This species has also been collected in a greenhouse complex.

Coleomegilla maculata lengi Timberlake: Anne Arundel, Baltimore, Caroline, Carroll, Kent, Prince George's, Queen Anne's, St. Mary's, Somerset, Talbot, Wicomico, Worcester. *Acer rubrum*, *Coreopsis* sp., *Euonymus alata*, *E. japonica* Thunb., *Forsythia intermedia*, *Gleditsia tricanthos*, *Hedera helix* L., *Hibiscus* sp., *Ilex crenata*, *I. opaca* Ait., *Juglanus* sp., *Magnolia* sp., *Phlox* sp., *Pinus* sp., *P. sylvestris*, *Prunus* sp., *Pyracantha* sp., *Rosa* sp., *R. rugosa*, *Quercus* sp., *Salix* sp., *Spiraea* sp., *Taxus* sp., *Tsuga canadensis*, *Vitis* sp., *Z. serrata*. Feeding on aphids; associated with *Pineus strobi* (Hartig) (Homoptera: Phylloxeridae) and *Dymicoccus wisteriae* (Green) (Pseudococcidae). April, May, June, July, August. This was the second most common species in this survey (45 locations).

Cycloneda munda (Say): Anne Arundel, Baltimore, Charles, Harford, Montgomery, Prince George's, Queen Anne's, Wicomico. *Acer* sp., *Betula pendula* Roth, *Malus* sp., *Pyracantha* sp., *Quercus palustris* Muenchh., *Taxus* sp. Feeding on aphids. May, June, July, August. Fifteen locations.

Olla v-nigrum (Mulsant): Anne Arundel, Prince George's, Talbot, Worcester. *Magnolia* sp., *Ulmus* sp. Associated with *Toumeyella liriodendri* (Gmelin) (Homoptera: Coccidae). May, June, September. Five locations.

Hippodamia convergens Guérin: Anne Arundel, Baltimore, Carroll, Frederick, Harford, Kent, Montgomery, Prince George's, St. Mary's, Washington, Wicomico, Worcester. *Acer rubrum*, *Cornus florida*, *Elageanus umbellata*, *Euonymus alata*, *Fraxinus* sp., *Hedera helix*, *Hibiscus syriacus* L., *Hydrangea* sp., *Juglanus* sp., *Malus* sp., *Picea abies*, *Prunus* sp., *Pyracantha* sp., *Quercus* sp., *Rosa* sp., *Viburnum* sp. Feeding on aphids. April, May, June, August.

This was the third most common species collected (39 locations).

H. glacialis (Fab.): Kent, Somerset. July. Two locations.

Mulsantia picta (Randall): Caroline, Howard, Kent. May, June. Three specimens.

Neoharmonia venusta venusta (Melsheimer): Anne Arundel. *Salix* sp. May. One specimen.

Psylloborini

Psyllobora vigintimaculata (Say): Charles, Kent. May, September. Three locations.

ACKNOWLEDGMENTS

We would like to thank K. M. Berry, S. M. Bohlen, T. S. Creel, J. Fishback, K. Hogsten, D. C. Laughlin, L. C. Miles, S. C. Parry, J. P. Smokonich, S. J. Stevenson, J. A.

Wolinski, and M. E. Zastrow for their assistance in collecting specimens in the field.

We thank J. J. Drea, R. M. Hendrickson, and the rest of the staff of the Beneficial Insects Lab, USDA for supplying the *Chilocorus kuwanae* released in Maryland nurseries.

W. F. Gimpel, Jr., Maryland Department of Agriculture, and J. A. Davidson, University of Maryland, commented on earlier drafts of this manuscript.

Maryland Department of Agriculture Contribution Number 60-89.

LITERATURE CITED

- Bailey, L. H. and E. Z. Bailey. 1976. Hortus Third. Macmillan Publ. Co., New York. 1290 pp.
 Gordon, R. D. 1985. The Coccinellidae (Coleoptera) of America north of Mexico. J. New York Entomol. Soc. 93: 1-912.